REMARKS/ARGUMENTS

Claims 8-10, and 12-17 are pending. Claim 16 has been amended to correct a minor informality. No new matter has been introduced.

Claims 8-10 and 15-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Shouji et al. (US 6,033,580) in view of Chen et al. (US 6,776,891).

Claims 8-10

Applicants respectfully submit that claim 8 is patentable over Shouji et al. and Chen et al. because, for instance, they do not teach or suggest a magnetic layer, which is formed by electroplating in a plating bath having pH value of 2 or less and is nearest to the magnetic gap of the magnetic layers, and contains Co, Ni, and Fe, with $20 \leqq Co \leqq 40$ wt%, $0 < Ni \leqq 2$ wt%, and $60 \leqq Fe \leqq 80$ wt%, and has a saturation magnetic flux density of 23,000 gauss or more. The present invention provides a smooth, thick, glossy, and clear CoNiFe alloy film with a high corrosion resistance so that a saturation flux density of 23000 gauss or more has been achieved. See paragraph [0010] at page 2, lines 15-17; and paragraph [0041] at page 8, lines 17-21.

Shouji et al. discloses an upper and a lower pole and a gap layer, but it does not disclose a magnetic layer containing Co, Ni, and Fe, with $20 \leqq Co \leqq 40$ wt%, $0 < Ni \leqq 2$ wt%, and $60 \leqq Fe \leqq 80$ wt%, and also does not disclose a magnetic layer having a saturation magnetic flux density of 23,000 gauss or more. It merely discloses 81-permalloy (81 Ni-19 Fe), 94 Co-6Fe, 45 Ni-55 Fe, or FeTaN, and 30 Fe-25 Co-45 N, which also does not have a saturation magnetic flux as in the claimed invention (col. 6, lines 61-65). In addition, Shouji fails to disclose the pH value of 2 or less in the plating bath used for electroplating a magnetic layer of the magnetic core as in the claimed invention.

Chen et al. discloses a method for forming a thin film magnetic alloy suitable for magnetic write heads. It states at column 3, lines 10-17: "In accord with the objects of this invention there is provided an alloy of Co-Fe-M, wherein the element M can be chosen from the group consisting of Mo, Cr, W, Ni or Rh and wherein said alloy has a composition of the form $Co_{100-a-b}Fe_aM_b$, wherein a is between 50 and 80 and b is between 0 and 10 and

wherein the as-deposited saturation magnetic moment is greater than 20 kG and the easy-axis coercivity is less than 7 Oe."

Chen et al., however, does not disclose to which portion the plated film is applied. Moreover, the pH used for plating in Chen et al. is 2-4 (see Table 2). This is different from the pH value of 2 or less as recited in the claimed invention. As stated in the Declaration under 37 CFR 1.132 by Kazue Kudo, in order to achieve a magnetic layer having enough thickness of smooth surface, the plating bath used for electroplating should be pH value of 2 or less. Graph 1 attached to the Declaration by Kudo shows a significant drop in thickness with smooth surface at pH value of 2.

Applicants respectfully submit that the claimed pH value of 2 or less produces unexpected results. In *In re Aller*, 105 U.S.P.Q. 233, 235 (C.C.P.A. 1955), the court stated that if the recited ranges were shown to be "critical" ranges that produced a new and unexpected result, then the claimed process would be patentable. When the specification describes a range that is not merely preferred but necessary, such a range is critical. *In re Waymouth*, 182 U.S.P.Q. 290, 293 (C.C.P.A. 1974).

In the present application, the specification itself has established that the recited pH range is critical. See, e.g., paragraph [0037] at page 7, lines 17-28; and paragraph [0041] at page 8, lines 14-21. As further stated in the Declaration under 37 CFR 1.132 by Kazue Kudo, in order to achieve a magnetic layer having enough thickness of smooth surface, the plating bath used for electroplating should be pH value of 2 or less. The result of Graph 1 attached to the Declaration by Kudo shows a significant drop in thickness with smooth surface at pH value of 2.

Nothing in Chen et al. indicates that the pH value range is important or has any effect on the thickness of smooth surface of the magnetic layer. Thus, this is not a situation where the general conditions of a claim are disclosed in the prior art, so that the recited range is not merely the discovery of the optimum or workable ranges by routine experimentation.

It is well established that a claimed range can be critical even if it overlaps with a range disclosed in the prior art. The overlap in the claimed range of 2 or less and the range of 2-4 in Chen et al. is merely a single value of 2. Indeed, a claimed range can be

critical even if it is enveloped by a range disclosed in the prior art. *Waymouth* involved a high pressure discharge lamp that produced white light from a mixture of halogen and mercury atoms present in a specified ratio of a range from 0.08 to 0.75. *Id.* at 291. The cited reference discloses a range from 0.0000001 to 1.3, which envelopes the claimed range. The court concluded that the claimed range was a critical range that produced unexpected results even though the prior art disclosed a range of possible ratios that enveloped the claimed range. *Id.* at 293. In reversing the rejection of the claims, the court noted that it was the applicant who had discovered that any relationship existed at all between the halogen atom to mercury atom ratio and the intensity of white light emission. *Id.*

In the present case, the inventors discovered it was critical to use a pH value of 2 or less for the plating bath to achieve a magnetic layer having enough thickness of smooth surface. In addition, while Chen et al. et al. is completely silent as to thickness of smooth surface, the inventors have discovered that a relationship exists between the pH value of the plating bath and the thickness of smooth surface for the magnetic layer.

For at least the foregoing reasons, claim 8 and claims 9-10 depending therefrom are patentable over Shouji et al. and Chen et al.

Claims 15-17

Applicants respectfully submit that independent claim 15 is patentable over the cited references because, for instance, they do not teach or suggest a first magnetic layer formed by electroplating in a plating bath having pH value of 2 or less; wherein at least a first part of the first magnetic layer contains Co, Ni, and Fe, with $20 \leqq Co \leqq 40$ wt%, $0 < Ni \leqq 2$ wt%, and $60 \leqq Fe \leqq 80$ wt%, and has a saturation magnetic flux density of 23,000 gauss or more.

As discussed above, the recited composition of the nearest magnetic layer is different from that of the nearest magnetic layer in Shouji et al., which does not disclose a magnetic layer containing Co, Ni, and Fe, with $20 \leqq Co \leqq 40$ wt%, $0 < Ni \leqq 2$ wt%, and $60 \leqq Fe \leqq 80$ wt%, and also does not disclose a magnetic layer having a saturation magnetic flux density of 23,000 gauss or more. It merely discloses 81-permalloy (81 Ni-19 Fe), 94 Co-6Fe, 45 Ni-55 Fe, or FeTaN, and 30 Fe-25 Co-45 N, which also does not have a saturation

magnetic flux as in the claimed invention (col. 6, lines 61-65). In addition, Shouji fails to disclose the pH value of 2 or less in the plating bath used for electroplating a magnetic layer of the magnetic core as in the claimed invention.

Chen et al. fails to cure the deficiencies of Shouji et al. For example, Chen et al. does not disclose to which portion the plated film is applied, and the pH used for plating in Chen et al. is 2-4. Thus, Chen et al. fails to disclose the critical range for the pH value of 2 or less.

For at least the foregoing reasons, claim 15 and claims 16-17 depending therefrom are patentable over Shouji et al. and Chen et al.

Claims 12-14

Claims 12-14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Shouji et al. in view of Chen et al. and Hashimoto et al. (US 2003/0188422A1).

Applicants respectfully submit that new independent claim 12 is patentable over the cited references because, for instance, they do not teach or suggest forming a second magnetic layer on the underlayer by electroplating; wherein at least a first part of the second magnetic layer contains Co, Ni, and Fe, with $20 \leqq Co \leqq 40$ wt%, $0 < Ni \leqq 2$ wt%, and $60 \leqq Fe \leqq 80$ wt%, and has a saturation magnetic flux density of 23,000 gauss or more.

As discussed above, the recited composition of the nearest magnetic layer is different from that of the nearest magnetic layer in Shouji et al., which does not disclose a magnetic layer containing Co, Ni, and Fe, with $20 \leqq Co \leqq 40$ wt%, $0 < Ni \leqq 2$ wt%, and $60 \leqq Fe \leqq 80$ wt%, and also does not disclose a magnetic layer having a saturation magnetic flux density of 23,000 gauss or more. It merely discloses 81-permalloy (81 Ni-19 Fe), 94 Co-6Fe, 45 Ni-55 Fe, or FeTaN, and 30 Fe-25 Co-45 N, which also does not have a saturation magnetic flux as in the claimed invention (col. 6, lines 61-65). In addition, Shouji fails to disclose the pH value of 2 or less in the plating bath used for electroplating a magnetic layer of the magnetic core as in the claimed invention.

Chen et al. fails to cure the deficiencies of Shouji et al. For example, Chen et al. does not disclose to which portion the plated film is applied, and the pH used for plating in